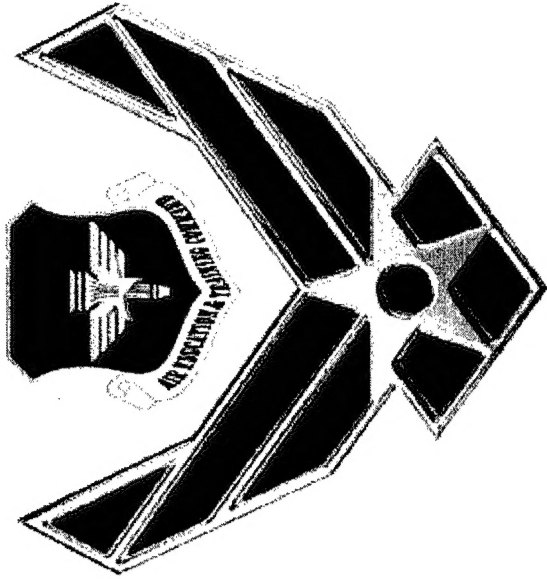


# Air Education and Training Command

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## Occupational Survey Report

### AFSC 4B0X1 BIOENVIRONMENTAL ENGINEERING

Mr. James Earles  
21 NOV 02

**U.S. AIR FORCE**

20031126 073

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*Integrity - Service - Excellence*

# Air Force Occupational Measurement SQ

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**AFOMS/OAL**

1550 Fifth Street East  
Randolph AFB, TX 78150

DSN 487-5030

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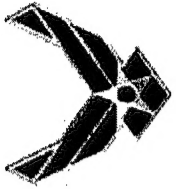
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# Overview



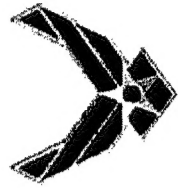
- Survey background
- Survey results
- Implications and way ahead



# Work Performed

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- Perform, supervise, manage, and direct activities in industrial hygiene, occupational health, radiological health, and environmental protection
- Monitor water quality, waste treatment and disposal
- Monitor chemical spills, hazardous and toxic substances
- Monitor work environment noise, radiation, illumination, ventilation, ergonomics, and thermal stress
- Consult on chemical, biological, and radiological contaminants
- Inventory base radiation sources and monitor radioactive waste disposal and shipment

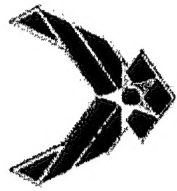


# Survey Background



- Survey initiated to obtain data to:
  - Evaluate current classification and training documents
  - Support promotion test development
  - Out of cycle (1 year early - last revision of CFETP was not accepted)
- Last Occupational Survey Report (OSR) - July 2000
- Current survey data collected- April-June 2002
- Components Surveyed:
  - Active Duty: 3-, 5-, 7- and 9-Skill Levels
  - Guard: 5-, 7- and 9-Skill Levels
  - Reserve: 5-, 7- and 9-Skill Levels





# Current Training Program



- AFSC awarding course
  - USAFSAM/AE, Brooks AFB, TX
  - B3ABY4B031-002, Bioenvironmental Engineering Apprentice Course, 14 weeks, 2 days
  - 20 Semester hours for CCAF

## Programmed TPR

FY02: 148 students

FY03: 136 students

## Programmed Elimination Rate

FY02: 10%

FY03: 10%



# Survey Sample Characteristics



	<u>AD</u>	<u>AFRC</u>	<u>ANG</u>	<u>Total</u>
Assigned*	828	71	195	1,094
Mailed Out	690	63	181	934
Sample	483	20	78	581
Usable Returns	70%	32%	43%	62%

- Average time in career field for AD: 7 yrs 4 months
- Average TAFMS for AD: 8 yrs 5 months
- Percent of AD in first enlistment: 37%

\* Assigned as of December 01

4BOX1



# Skill & Paygrade Characteristics



## Skill Level Distribution

	Assigned*	Sample
3-Level -	24%	25%
5-Level -	38%	41%
7-Level -	36%	31%
9-Level -	2%	3%

## Paygrade Distribution

	Assigned*	Sample
E-1 - E-3 -	16%	14%
E-4 -	25%	25%
E-5 -	28%	27%
E-6 -	15%	17%
E-7 -	15%	15%
E-8 -	1%	2%

\* Assigned as of Dec 01



# Command Representation



**AETC**

Command	Assigned %*	Sample %
AETC	9	9
AMC	12	17
ACC	14	14
AFMC	19	23
USAFE	5	5
PACAF	8	7
AFSPC	4	5
AFRC	7	3
ANG	18	13
OTHER	4	4

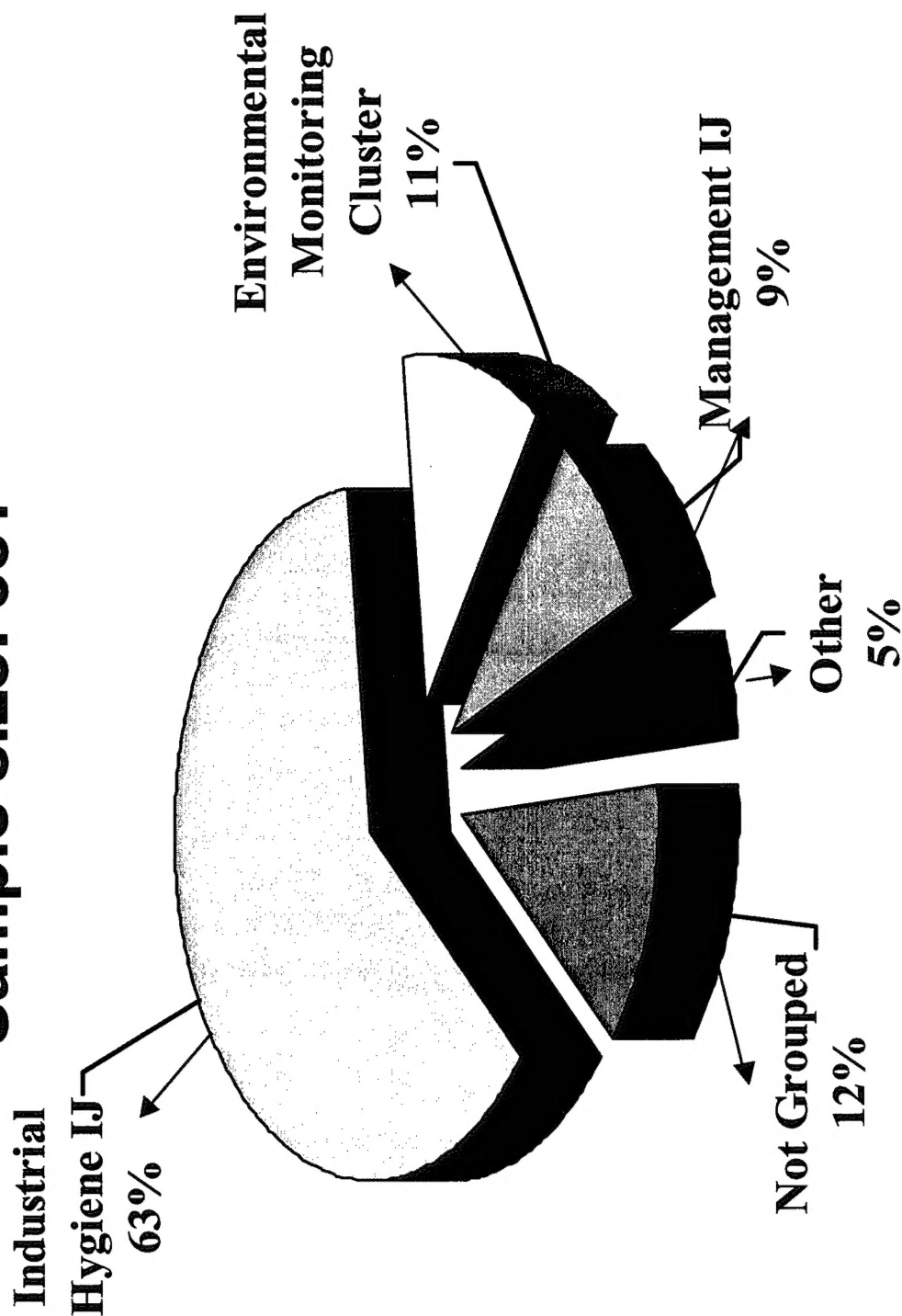
\* Assigned as of December 01



# Job Structure

**AETC**

**Sample size: 581**



Other: Entry-Level Water Analysis IJ-3%, Chemical Hazards IJ-1%,  
Radiological Health Program IJ-1%, Respiratory Protection IJ-1%,  
Thermoluminescent Dosimeter IJ, Trainer IJ-1%

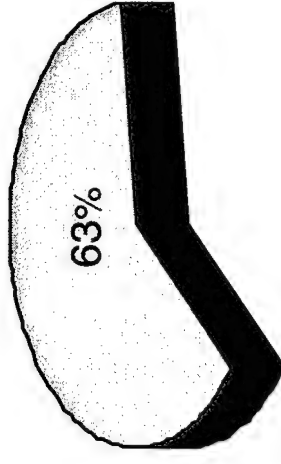


# Core Independent Job



- **Industrial Hygiene IJ (N=346)**

- Evaluate shop hazardous communication (HAZCOM) programs
- Evaluate chemical inhalation hazards
- Interview shop personnel
- Research and interpret material safety data sheets (MSDSs)
- Conduct opening and closing conferences
- Brief shop personnel on chemical, biological, or physical hazards



9%



# Environmental Monitoring Cluster

## (N=63)



- Perform pH, chlorine, and fluoride analysis
- Collect, transport, and ship water samples
- Collect bulk environmental samples
- Prepare environmental samples for shipment including forms, labels, or chains of custody
- Document results of analysis and prepare reports
- Prepare or preserve sample containers

Environmental Protection Job
Entry-Level Environmental Protection Job
Environmental Protection NCOIC Job





# Independent Jobs



- **Entry-Level Water Analysis IJ (N=15)**

- Perform chlorine analysis
- Perform pH analysis
- Collect potable water samples for bacterial analysis
- Transport water samples
- Prepare water samples for shipment



3%

9%



# Independent Jobs



- **Chemical Hazards IJ (N=6)**

- Verify chemical inventories
- Evaluate chemical inhalation hazards
- Evaluate chemical contact or absorption rates
- Determine or establish administrative controls for chemical hazards
- Determine or establish engineering controls for chemical hazards
- Determine or establish regulated areas for chemical hazards



1%

9%



# Independent Jobs



- **Radiological Health Program IJ (N=6)**

- Survey radioactive permit or material storage areas
- Inventory radioactive material sources or ionizing radiation producing devices, meters, or facilities
- Review, interpret, or record results of radiological swipes
- Inspect radiation safety programs of x-ray facilities
- Inventory radio frequency radiation (RFR) sources
- Conduct as-low-as-reasonably-achievable (ALARA) training



1%

9%



# Independent Jobs



- **Respiratory Protection IJ (N=5)**

- Perform quantitative fit-testing, such as port-a-count, other than gas masks
- Perform fit testings for chemical warfare masks
- Conduct respiratory protection (RP) training
- Evaluate work areas for RP compliance
- Select RP equipment



9%



# Independent Jobs



## • Thermoluminescent Dosimeter (TLD) Program IJ (N=5)

- Exchange TLDs
- Review or interpret TLD results
- Review or interpret histories of occupational exposure to ionizing radiation
- Enroll personnel in TLD programs
- Evaluate storage of TLDs
- Prepare TLDs for shipment
- Investigate exposures above action levels or overexposures to ionizing radiation

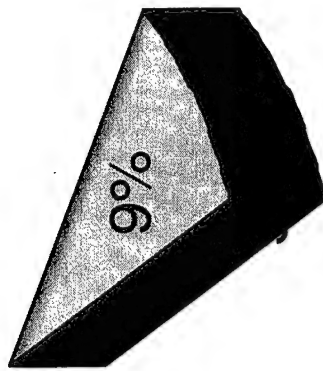




# Independent Jobs



- **Management IJ (N=51)**
  - Write recommendations for awards or decorations
  - Counsel subordinates concerning personal matters
  - Interpret policies, directives, or procedures for subordinates
  - Evaluate personnel to determine training needs
  - Evaluate personnel for promotion, demotion, reclassification, or special award





# Independent Jobs



- **Trainer IJ (N=7)**

- Conduct formal course classroom training
- Personalize lesson plans
- Develop or procure training materials or aids
- Establish or maintain study reference files
- Determine training requirements

1%

9%



# Career Ladder Progression



- 3- and 5-skill-level personnel
  - Work in the most technical jobs in the career field
  - Spend most of their time on technical tasks
- 7-skill-level personnel
  - Continue to perform technical tasks
  - However, take on supervisory, training, and administrative duties
- 9-skill-level personnel
  - Perform technical tasks infrequently
  - Spend over two-thirds of their time on management, training, and administrative duties



# Percent Across Specialty Jobs

## DAFSC



CLUSTERS & JOBS	DAFSC 4B031 (N=147)	DAFSC 4B051 (N=366)	DAFSC 4B071 (N=265)	DAFSC 4B091 (N=15)
Industrial Hygiene IJ	50	67	62	20
Environmental Monitoring CLUS	21	11	3	*
Entry-level Water Analysis IJ	10	*	*	*
Chemical Hazards IJ	1	1	*	*
Radiological Health Program IJ	1	1	*	*
Respiratory Protection IJ	1	*	2	*
Thermoluminescent Dosimeter Prog IJ	3	*	*	*
Management IJ	*	3	19	67
Trainer IJ	*	*	3	*
Not Grouped	12	15	10	12

Columns may not add to 100 due to rounding.

\* Less than 1 percent



# Career Ladder Progression Percent Time Spent on Duties



	DAFSC 4B031 (N=147)	DAFSC 4B051 (N=366)	DAFSC 4B071 (N=265)	DAFSC 4B091 (N=15)
--	---------------------------	---------------------------	---------------------------	--------------------------

Monitoring drinking water, swimming pools, or spas	22	8	5	3
Performing environmental monitoring	8	6	5	2
Performing industrial hygiene activities	47	47	30	9
Performing radiological health program activities	7	7	6	2
Performing or practicing peacetime disaster ops	1	2	2	3
Performing or practicing wartime disaster ops	4	5	7	8
Performing general admin & to system activities	1	1	3	3
Performing general supply and equipment activities	4	4	4	4
Performing medical readiness activities	2	3	4	4
Performing training activities	1	6	10	10
Performing management and supervisory activities	3	11	25	53

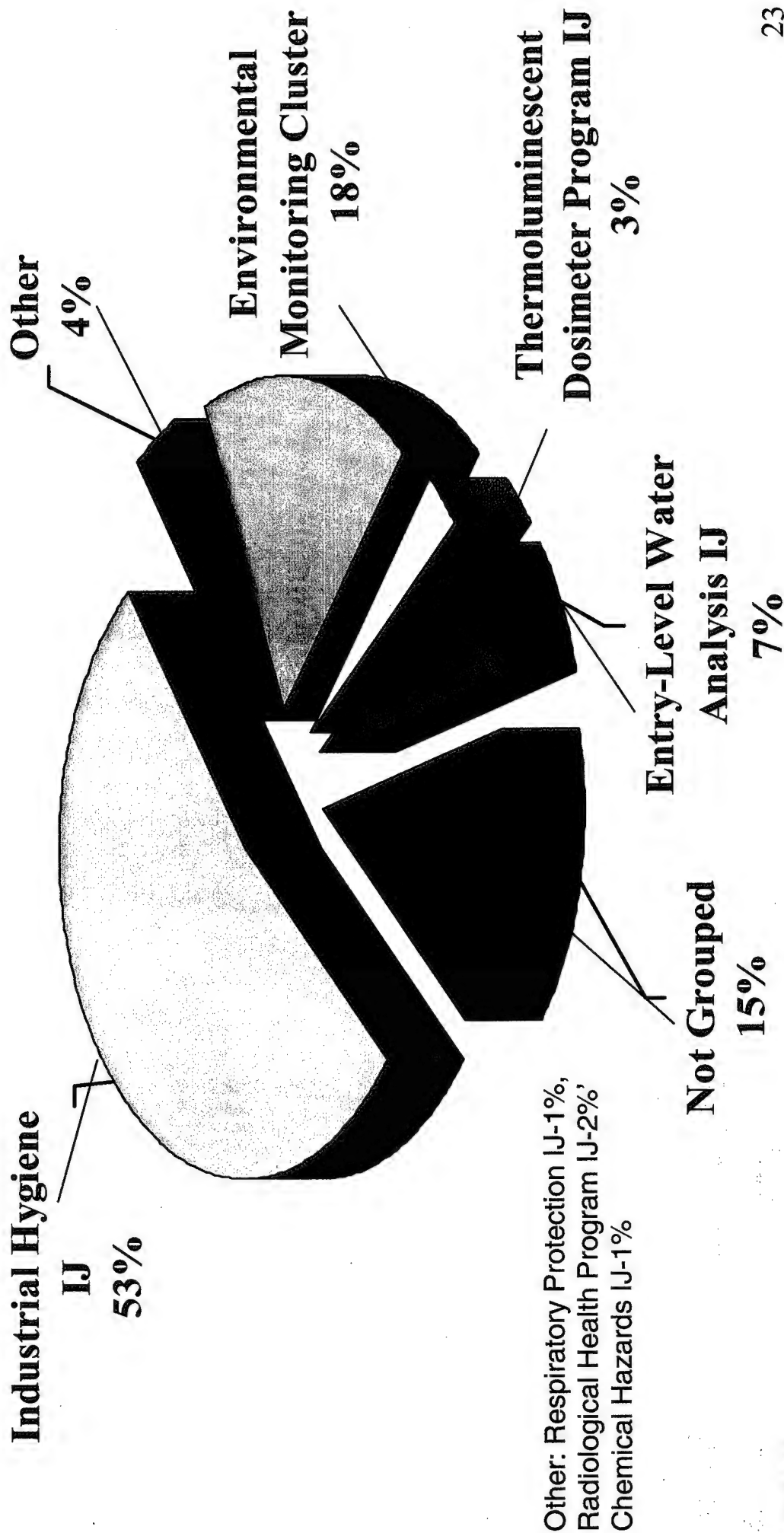
Columns may not add to 100 due to rounding.



# First-Enlistment Job Structure

**AETC**

Sample size: 177





# First-Enlistment Personnel Representative Tasks



Tasks	Percent Members Performing (N=177)
Perform quantitative fit-testings, such as port-a-count, other than gas masks	75
Perform sound-level measurements, such as dBA or dBC	72
Verify chemical inventories	71
Perform noise dosimetry surveys	69
Perform routine ventilation surveys	67
Identify hazardous noise sources	67
Perform pH analyses	66
Conduct opening and closing conferences	66
Perform chlorine analyses	65
Interview shop personnel	65
Evaluate shop hazardous communication (HAZCOM) programs	65
Brief shop personnel on chemical, biological, or physical hazards	63
Collect potable water samples for bacterial analyses	61
Research and interpret material safety data sheets (MSDSs)	60
Evaluate chemical inhalation hazards	60



# First-Enlistment Personnel Support Equipment



	Percent Members Performing (N=177)
<u>Support Equipment</u>	
Calculators	84
Dosimeters, Noise	81
Quantitative Fit test Machines, Portacount	79
Air Sampling Pumps	78
Cameras, Digital	72
Wet Bulb Temperature Instruments	72
Test Kits, Chlorine pH	71
Air Sampling Sorbent Tubes, such as Charcoal Tubes	68
Computer Equipment	68
Bacteriological Water Kits	67
Personal Protective Equipment, Peacetime	65
Analyzers, Octave Band Noise	62
Meters, Sound Level	59
Air Sampling Filters	58
Samplers, Air	56
Sound Level Calipers	56



# First-Enlistment Personnel Software



Percent  
Members  
Performing

(N=177)

## Software

Command Core Systems

Environmental Management Information System (EMIS)

DoD Hazardous Materials Information System (HMIS)

Portacount Software, such as Fit Plus and QNFT

Noise Dosimetry Software

OSHA Internet Site

Armstrong Laboratory Sample Guide

75

59

58

58

49

49

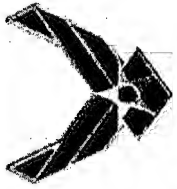
29



# First-Enlistment Personnel Forms



Forms	Percent Members Performing (N=177)
AF 2756, Noise Survey – Dosimetry	75
AF 2750, Industrial Hygiene Sampling Data	68
AF 2755, Master Workplace Exposure Data Summary	68
AF 2758, Industrial Hygiene Survey Data Sheet	65
AF 2772, Certificate of Respirator Fit Test	63
AF 2754, Chronological Record of Workplace Surveillance	61
AF 2761, Hazardous Materials Data	54
DD 2214, Noise Survey	54
AF 55, Employee Safety and Health Record	53
AF 2763, Industrial Hygiene Ventilation Presurvey	49
AF 2751, Bulk Material Sampling Data	47
AF 190, Occupational Illness/Injury Report	46
AF 2752, Environmental Sampling Data	45
AF 2762, Listing of Industrial Hygiene Sample Results	44
AF 3952, Chemical HAZMAT Material Request/Authorization	44
AF 2764, Industrial Ventilation Survey Pitot Velocity Method	40



# Specialty Training Standard (STS) Analysis

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- STS is well supported by survey data
  - Several 1a STS items were unsupported
  - Only one 2b STS item unsupported
- Several STS items require proficiency code review
  - These should be reviewed for possible proficiency code inclusion
- One technical task performed by 20 percent or more of members was not referenced to STS
  - This task should be reviewed for possible inclusion in STS



# Unsupported STS Elements



**AFRC**

## Examples

### PERCENT MEMBERS PERFORMING

UNIT	LEARNING OBJECTIVE	PROF CODE	1ST		TNG EMP	TSK DIF	ATI
			JOB (N=58)	ENL (N=177)			

4.7.11. Perform speech interference level surveys

1a

Task C0165. Perform speech interference level (PSIL) surveys

9

10

2.53

5.50

2

4.13.4 Inventory radioactive material sources  
Task D0205. Inventory radioactive material sources

1a

9

11

3.30

5.68

7

4.25.3 Collect biological or bio-aerosol samples for indoor air quality (IAQ)  
Task C0148. Collect biological or bio-aerosol samples for indoor air quality (IAQ)

2b

12

11

2.91

6.09

7

Mean TE Rating is 2.82, Standard Deviation is 1.68 (HIGH TE= 4.50)

Mean TD Rating is 5.00, Standard Deviation is 1.00 (HIGH TD= 6.00)



# STS Elements for Proficiency Review



## Examples

### PERCENT MEMBERS PERFORMING

UNIT	LEARNING OBJECTIVE	PROF CODE	1ST		TNG EMP	TSK DIF	ATI
			JOB (N=58)	ENL (N=177)			
4.2.13.	Prepare activity based survey reports	-					
Task C0108.	Prepare activity based survey reports		38	51	5.83	5.21	18
4.5.10	Research and interpret material safety data sheets (MSDS)	-					
Task C0121.	Research and interpret material safety data sheets (MSDS)		52	60	6.06	4.34	18

Mean TE Rating is 2.82, Standard Deviation is 1.68 (HIGH TE= 4.50)  
Mean TD Rating is 5.00, Standard Deviation is 1.00 (HIGH TD= 6.00)



# Tasks not Referenced to STS



## Examples

### PERCENT MEMBERS PERFORMING

TASKS	1ST		TNG		TSK	
	JOB	ENL	EMP	DIF	ATI	
D0221 Evaluate storage of TLDs	40	36	5.30	3.26	10	

Mean TE Rating is 282, Standard Deviation is 1.68 (HIGH TE= 4.50)  
Mean TD Rating is 5.00, Standard Deviation is 1.00 (HIGH TD= 6.00)



# Job Satisfaction Indicators (Current vs. Previous Study)

	1-48 Months		49-96 Months		97+ Months	
	2002 (N=177)	2000 (N=174)	2002 (N=107)	2000 (N=97)	2002 (N=199)	2000 (N=167)
Job interesting	67	77	71	66	79	87
Talents well utilized	80	79	85	87	87	92
Training well utilized	91	90	89	86	86	88
Sense of accomplishment	61	71	65	51	71	75
Plan to reenlist	49	45	63	49	63	65



# Job Satisfaction Indicators (AFSC 4B0X1 vs. Comparative Sample)



	1-48 Months		49-96 Months		97+ Months	
	2002 4B0X1 (N=177)	Comp Sample* (N=444)	2002 4B0X1 (N=107)	Comp Sample* (N=306)	2002 4B0X1 (N=199)	Comp Sample* (N=661)
Job interesting	67	80	71	76	79	82
Talents well utilized	80	80	85	83	87	88
Training well utilized	91	85	89	85	86	85
Sense of accomplishment	61	72	65	72	71	79
Plan to reenlist	49	50	63	62	63	60

\* Comparative sample of AFSCs surveyed in the last 12 months includes: 4C0X1, 4M0X1, 4N1X1, 4V0X1, 4Y0X2



# Job Satisfaction Indicators (AD) (Across Specialty Jobs)



	Industrial Hygiene IJ (N=275)	Environ Monitoring Cluster (N=62)	Entry-Lvl Water Analysis IJ (N=15)	Chemical Hazards IJ (N=5)
Job interesting	75	63	60	80
Talents well utilized	87	79	87	80
Training well utilized	91	82	93	100
Sense of accomplishment	69	63	73	80
Plan to reenlist	63	50	27	0



# Job Satisfaction Indicators (AD) (Across Specialty Jobs cont.)



	Radiological Health Program IJ (N=6)	TLD Program IJ (N=5)	Mgmt IJ (N=51)	Trainer IJ (N=6)
Job interesting	67	80	82	67
Talents well utilized	50	80	86	67
Training well utilized	83	100	78	83
Sense of accomplishment	67	80	63	67
Plan to reenlist	50	0	43	33



# Retention Dimensions First-Term Airmen (N=177)



**AETC**

Planning to Reenlist (N=87)	Percent Responding	Average
Job security	75	2.55
Medical or dental care for AD member	72	2.63
Military-related education/training opportunities	67	2.47
Off-duty education and training opportunities	62	2.54
Medical or dental care for family members	60	2.67
Planning to Separate (N=90)		
Military lifestyle	58	2.46
Pay and allowances	47	2.48
Civilian job opportunities	44	2.47
Location of present assignment	42	2.50
Esprit de corps/morale	40	2.47

Scale: 1 = slight influence, 2 = moderate influence, 3 = strong influence



# Retention Dimensions Second-Term Airmen (N=107)



	Percent	
	Responding	Average
<b>Planning to Reenlist (N=67)</b>		
Bonus or special pay	79	2.64
Medical or dental care for AD member	70	2.64
Retirement benefits	67	2.62
Pay and allowances	66	2.16
Off-duty education or training opportunities	63	2.55
<b>Planning to Separate (N=39)</b>		
Promotion opportunities	74	2.60
Military lifestyle	54	2.38
Esprit de corps/morale	49	2.58
Pay and allowances	46	2.44
Recognition of efforts	46	2.59

Scale: 1 = slight influence, 2 = moderate influence, 3 = strong influence



# Retention Dimensions Career Airmen (N=199)



	Percent Responding	Average
Planning to Reenlist (N=125)		
Retirement benefits	68	2.79
Job security	62	2.53
Off-duty education and training opportunities	59	2.39
Military lifestyle	54	2.10
Pay and allowances	52	2.52
Planning to Separate (N=19)		
Civilian job opportunities	53	2.60
Pay and allowances	42	2.38
Additional duties	42	1.75
Unit manning	42	2.38
Esprit de corps/morale	42	2.12

Scale: 1 = slight influence, 2 = moderate influence, 3 = strong influence



# Summary of Results



- Career ladder progression typical
  - Highly technical at 3-skill level progressing to more managerial at 7-skill level and beyond
- Career ladder documents well-supported by survey data
  - STS provides comprehensive coverage of work performed by career ladder
  - Review of some items warranted
- Job satisfaction indicators
  - Lower job interest and sense of accomplishment compared to previous study for first-enlistment personnel
  - Lower job interest and sense of accomplishment compared to similar AFSCs for first-enlistment personnel



# Way Ahead



- OSR Delivery Trip and Utilization and Training Workshop (U&TW) was 24-28 Jun 02 at Brooks AFB
- Next SKT rewrite (major) is scheduled for Jun 03



# Questions?



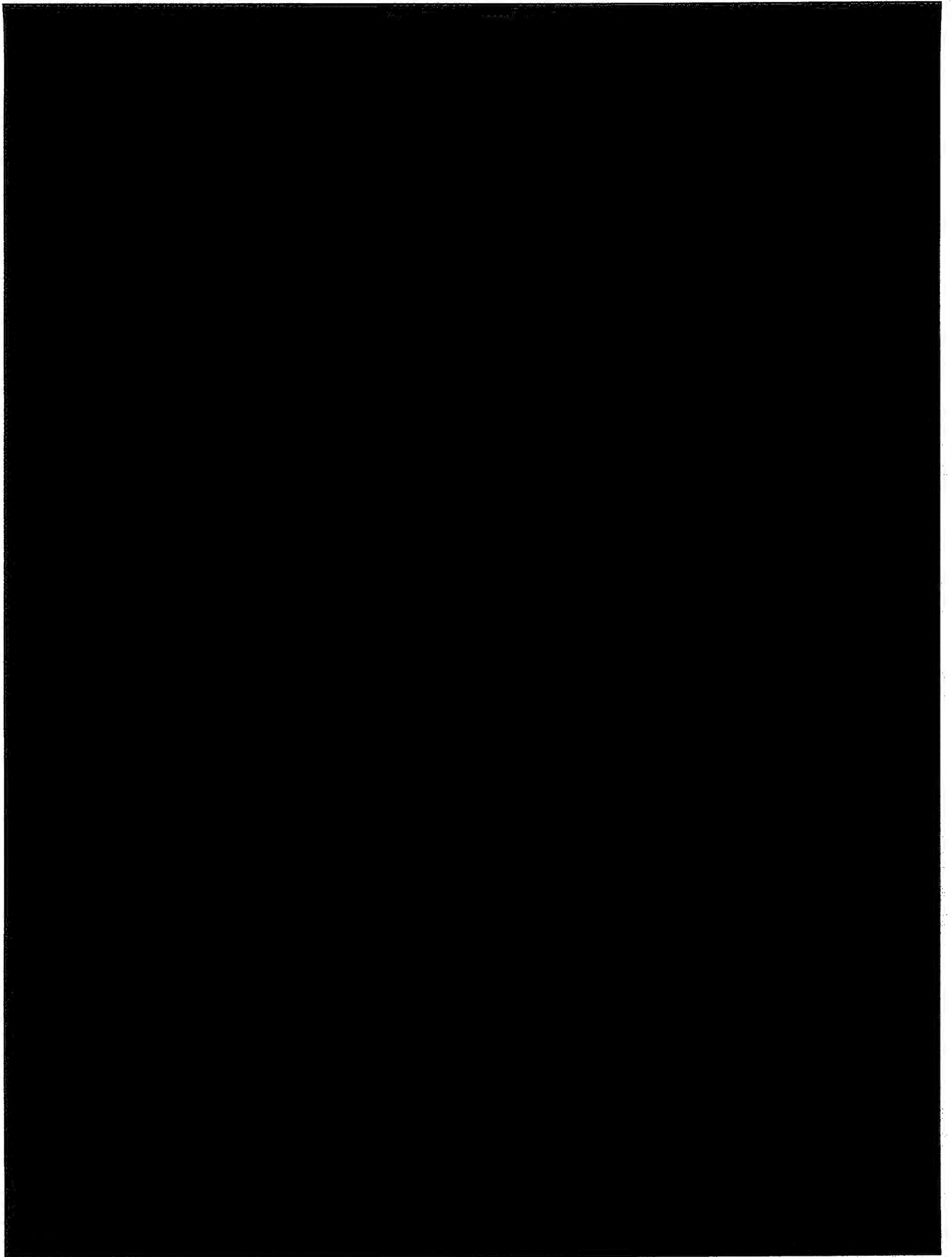
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E-Mail: [james.earles@randolph.af.mil](mailto:james.earles@randolph.af.mil)



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# Back-Up Slides



# Job Survey Background



- Previous JI and OSR
  - JI: 4BOX1-Jan 00, Lt Rahmer
  - OSR: 4BOX1-Jul 00, Ms Williams
  - Programming Support- Ms. Tilghman
- Issues from Last Post-Analysis Review
  - None



# Bases Visited during

## JI Development (# Interviewed)



- Brooks AFB, TX (Tech School) (6) 11-12 Oct 01
- Andrews AFB, MD (7) 24 Oct
- Eglin AFB, FL (5) 8 Nov
- Seymour Johnson AFB, NC (4) 15 Nov
- Robins AFB, GA (3) 28 Nov
- Brooks AFB, TX (Tech School) (3) 6 Dec



# Job Structure Glossary



- **Job:** A group of similar *positions* where incumbents perform many of the same tasks and spend relatively the same amount of time performing these tasks
- **Cluster:** A series or group of related *jobs* which are distinguishable from each other on some variable (weapon system maintained, ratio of supervisory to technical tasks, etc.)
- **Independent Job:** A job that does not fall within any cluster
- **N:** Number in sample



# Career Ladder Progression



- “Typical” career ladder progression
  - **3-Skill-Level** apprentices perform a very technical job which include very few administrative/supervisory tasks
  - **5-Skill-Level** journeymen still primarily perform a technical job, but acquire a mix of administrative/supervisory tasks
  - **7-Skill-Level** managers, and above, primarily perform supervisory, managerial, and administrative tasks, with relatively few technical tasks
- “Atypical” career ladder progression
  - **7-Skill-Level** personnel are still spending a significant amount of their total job time performing technical duties, with relatively few administrative/supervisory tasks



# Training Document Analysis



- Tasks from job inventory are matched to items in the STS and POI
  - Match is usually conducted with technical school personnel
- Final product provides technical school with data indicating applicability of training documents to work performed in the field in terms of:
  - Percent members performing (PMP) from AETCI 36-2601
    - » 20% PMP for STS
    - » 30% PMP for POI
  - TE and TD ratings
- Listing of tasks not referenced to training document also provided
  - May indicate areas where training coverage is lacking



# Task Factor Definitions



- **Training Emphasis (TE):** Task list completed by senior NCOs identifying those tasks that should be emphasized for structured training of first-term airmen
- **Task Difficulty (TD):** Task list completed by senior NCOs which rates the relative difficulty of each task to learn
- **Automated Training Indicators (ATI):** Indicators derived from comparing percent performing data with TE and TD data to assist in making training decisions



# Predictive Retention Indicators



- |   |   |
|---|---|
| • Military lifestyle                                | • Number of PCS moves                     |
| • Pay and allowances                                | • Location of present assignment          |
| • Bonus or special pay                              | • Number/Duration of TDY's or deployments |
| • Retirement Benefits                               | • Work schedule                           |
| • Military related education/Training opportunities | • Additional duties                       |
| • Off-duty education and training opportunities     | • Job security                            |
| • Medical or dental care for active duty member     | • Enlisted Evaluation System              |
| • Medical or dental care for family members         | • Promotion opportunities                 |
| • Base housing                                      | • Training/Experience of unit personnel   |
| • Base services                                     | • Unit manning                            |
| • Childcare needs                                   | • Unit resources                          |
| • Spouse's career                                   | • Unit readiness                          |
| • Civilian job opportunities                        | • Recognition of efforts                  |
| • Equal employment opportunities                    | • Esprit de corps/Morale                  |
|   | • Leadership of immediate supervisor      |
|   | • Senior Air Force leadership             |



# Retention Dimensions First-Term Airmen (N=177)



Planning to Reenlist (N=87)	Percent		S.D.
	Responding	Average	
Job security	75	2.55	.70
Medical or dental care for AD member	72	2.63	.60
Military related education/training opportunities	67	2.47	.65
Off-duty education and training opportunities	62	2.54	.71
Medical or dental care for family members	60	2.67	.64

## Planning to Separate (N=90)

Military lifestyle	58	2.46	.77
Pay and allowances	47	2.48	.73
Civilian job opportunities	44	2.47	.71
Location of present assignment	42	2.50	.72
Esprit de corps/morale	40	2.47	.80

Scale: 1 = slight influence, 2 = moderate influence, 3 = strong influence



# Retention Dimensions Second-Term Airmen (N=107)



Planning to Reenlist (N=67)	Percent		
	Responding	Average	S.D.
Bonus or special pay	79	2.64	.68
Medical or dental care for AD member	70	2.64	.56
Retirement benefits	67	2.62	.64
Pay and allowances	66	2.16	.65
Off-duty education or training opportunities	63	2.55	.62
Planning to Separate (N=39)			
Promotion opportunities	74	2.60	.49
Military lifestyle	54	2.38	.65
Esprit de corps/morale	49	2.58	.59
Pay and allowances	46	2.44	.60
Recognition of efforts	46	2.59	.69

Scale: 1 = slight influence, 2 = moderate influence, 3 = strong influence



# Retention Dimensions Career Airmen (N=199)



	Percent		
Planning to Reenlist (N=125)	Responding	Average	S.D.
Retirement benefits	68	2.79	.51
Job security	62	2.53	.69
Off-duty education and training opportunities	59	2.39	.73
Military lifestyle	54	2.10	.74
Pay and allowances	52	2.52	.61
Planning to Separate (N=19)			
Civilian job opportunities	53	2.60	.49
Pay and allowances	42	2.38	.70
Additional duties	42	1.75	.66
Unit manning	42	2.38	.86
Esprit de corps/morale	42	2.12	.60

Scale: 1 = slight influence, 2 = moderate influence, 3 = strong influence